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May 10, 1995

By Hand

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW
Washington, DC 20554

Re: Local Multipoint Distribution Service
CC Docket No. 92-297, Ex Parte Presentation

Dear Mr. Caton:

On May 10, 1995, the enclosed briefing paper prepared by CellularVision was provided to David R. Siddall, Legal Advisor to Commissioner Susan Ness. Enclosed are two (2) copies of this paper to be filed in the above-referenced LMDS rulemaking record.

Please direct any questions regarding this matter to the undersigned.

Sincerely,

Michael R. Gardner
Counsel for CellularVision

Enclosure

cc David R. Siddall

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MEMORANDUM

By Hand

TO: David Siddall

FROM: Mickey Gardner

DATE: May 10, 1995

SUBJECT: LMDS Services

As you requested following our meeting with the Commissioner, enclosed is a paper discussing current and prospective services provided by LMDS. This paper is based on CellularVision's status as the pioneer in developing LMDS, and its experience under its commercial and experimental LMDS licenses.

Enclosure

cc William F. Caton
LMDS Rulemaking Record

LMDS Services:
Currently Offered, Within State of the Art, and Future

The Local Multipoint Distribution Service ("LMDS") is a wireless cellular broadband interactive communications system designed to offer consumers with an array of video, telephony and data services. The following is a brief discussion of (1) the services currently offered by CellularVision of New York, L.P. ("CVNY") to consumers in New York pursuant to its commercial license authorizing a video LMDS service in the New York Primary Metropolitan Statistical Area; (2) the LMDS services which have been successfully tested pursuant to CVNY's commercial and experimental licenses; and (3) the comprehensive range of prospective LMDS services which are envisioned by LMDS system proponents.

LMDS utilizes the unique properties of millimeter wave propagation in the 27.5-29.5 GHz band ("28 GHz band") to provide a wireless cellular broadband interactive communications system for video, telephony and data services. LMDS is spectrum efficient — it is capable of 100% reuse of the same frequencies in adjacent cells. The unique characteristics of the 28 GHz band allow for spectral reflection without polarization change or large signal attenuation, thereby allowing for non line-of-sight reception. Due to its cellular architecture, an LMDS operator can specifically target services on a cell-by-cell basis to meet the demographic needs of consumers within a given cell.

The CellularVision technology employs a small aperture, six inch square flat plate subscriber antenna which produces high gains of typically 31 dB, the equivalent to an eight foot receive-only antenna at 2 GHz.

For 99.9% availability, the average cell area in the United States is 53 square miles. Rainfall intensity is the principal factor in determining the cell area. In New York City, for example, LMDS cells have a three mile radius, with an area of approximately 28 square miles.

I. Current LMDS Services — CVNY's Operating System

CVNY currently offers consumers in Brighton Beach, Brooklyn, New York a 49-channel video system as an alternative to cable television pursuant to its commercial license granted by the Commission in 1991. CVNY's system is fully addressable, and delivers studio quality pictures with compact disc quality sound. The CellularVision technology utilizes FM video modulation and has been demonstrated to produce a "high-resolution television" quality image on large projection screen displays. By comparison, these studio quality images are not achievable in coaxial cable systems — which use AM modulation and produce a poorer "cable quality" image under the best conditions. With CVNY's LMDS system, there is no ghosting of the television picture.

As demonstrated in the attached channel guide, CVNY's program offerings include commercial broadcast stations, public and educational stations, cable networks, national and regional sports networks, premium movie channels and pay-per-view channels. In addition, in view of the large Russian immigrant population residing in CVNY's Brighton Beach cell, CVNY's program offering includes a Russian language channel. CVNY offers consumers several program packages, ranging in price

from $19.95 to $34.95 per month — a cost of up to 40% less than comparable cable service.

Anticipating full deployment of its multi-cell system throughout its authorized service area, the New York Primary Metropolitan Statistical Area, CVNY has a fully staffed operations center capable of servicing its authorized service area. After perfecting the system with trial service to a small number of customers during the initial years of its license grant, CVNY commenced the full-scale commercial roll-out of its system in February 1995. CVNY is installing 40 new subscribers each day, for a current total of approximately 1,200 subscribers. In view of the Commission's failure to act on CVNY's 34 pending applications for new transmitter sites, CVNY expects to commence experimental service to consumers in three additional cells pursuant to its experimental license in the near term. By the end of 1995, CVNY will be adding approximately 120 new subscribers daily, reaching a December 31, 1995 total of 13,500.

II. Potential LMDS Services within State of the Art

LMDS is the only realistic competitor to the incumbent cable and telephone industries, and is the most economic and technically feasible method of delivering the Information Superhighway to the home, school, hospital or business. The capacity of the present system is as follows:

- 50 studio quality broadcast video channels
- 20,000 (GMSK) to 125,000 (4 kHz analog) simultaneous telephone calls

- 880 (GMSK) T-1 links
- 3,520 384 kb/s links to support full duplex video teleconferencing

Market demand will guide each LMDS operator's allocation of spectral capacity for particular services. It should be noted that CVNY currently offers consumers only the video component of LMDS because its commercial license is limited to a 49-channel video system.

CVNY's experimental licenses provide the basis for aggressive and ongoing research and development of LMDS technology. Major experimental results include the following:

- Video signals were demonstrated on an eight-foot TV screen, with no aspect angle and no noticeable "grain," resulting in excellent picture quality, resolution and sharpness.
- Two-way video teleconferencing (with audio) was established between the transmitter and a receive site with no interference using the same frequency band.
- The vertical blanking interval was used successfully to transmit facsimile information.
- CellularVision's Canadian licensee has downloaded a movie onto a standard VHS tape at 20 times normal speed. Thus, a two-hour movie could be burst sent to a customer in six minutes.
- Hub to subscriber transmission of digital video was accomplished without degradation of the source video. As with cable, however, this type of service will be provided in concert with the conventional analog service, albeit at a substantially increased cost, when it is commercially feasible.
- Three cells have been operated in New York. No inter-cell interference has been observed between the cells which overlap.
- A Bit Error Rate of better than one part in 10 billion was measured for line-of-sight reception, single bounce and double bounce reception. This

raw-channel bit error rate performance of LMDS indicates that it is an excellent candidate medium for the introduction of some digital video services in concert with conventional analog services when they become commercially and economically feasible.

- Experiments of digital interference into FM LMDS systems indicated a cable quality picture reception for C/I + N levels of 11 dB. Satisfactory performance was obtained for C/I + N levels of 8 dB. Thus, co-frequency sharing of the 28 GHz band with FSS systems is feasible while maintaining much better than 99.95% availability.

- A satellite VSAT uplink was simulated at a distance of less than 40 feet from an LMDS receiver, without affecting the availability of the LMDS reception even though both systems used the same frequency. This result is consistent with the conclusion of Bellcore that LMDS and Fixed Satellite Service systems can coexist with 99.9% availability.

III. Future LMDS Services — The Wireless Broadband Information Superhighway

The LMDS system architecture supports deployment of fully-symmetric, broadband interactive communications services as well as asymmetric video entertainment services. The technology underpinning these services has been demonstrated, and only two conditions need to be satisfied before these services are offered commercially — FCC licensing and a demonstrably positive business case for offering the services. While market conditions are positive for many LMDS services, the business case for others remains indeterminate. Nonetheless, these services are typical of what LMDS can provide in the future as the premier wireless broadband interactive full-service-network component of the NII:

1. **Business Data Services**
   - •Telephone service - Digital Local Exchange Bypass and IXC Access
   - •Narrowband ISDN / Broadband ISDN
   - •T1 / Fractional T1
   - •LAN Interconnection / Access / Wireless Bridging
   - •Remote Database Access

- Fiber Node Extension
- Frame Relay (Permanent Virtual Circuit)
- ATM Bandwidth on Demand / Cell Switching
- Multipoint Videoteleconferencing

- PCS and Wireless Data Backhaul
- Virtual and Private Network Services and Management

2. **Consumer Entertainment/Telecommunications Services**
   - Telephone service - Digital Local Exchange Bypass and IXC Access
   - Internet Text (e-mail / file transfer) and Hypermedia Graphics (WWW) Services
   - Digital Audio Programming
   - Home Entertainment Center with Large Screen TV used for Computer and TV
   - Interactive News / Information Services
   - Interactive Games (Single or Multiplayer) and Sports
   - Video on Demand or Near-Video on Demand; point casting of select customer ordered programming from large film libraries

3. **Public Safety/Utility Services**
   - Utility Telemetry and Energy Management
   - Wireless Access for Multimedia Kiosks / Event Management
   - Broadband Network Disaster Recovery — Backup Data Transport for Business, Education and Medical users
   - Emergency Management and Service Restoration
   - Fixed or Low-mobility Electronic Systems Monitoring and Telemetry — Low Power Broadband Data Communications (warehouse distribution facility, aircraft operations, etc.)

4. **Educational and Medical Services**
   - Interactive Distance Education / Homebound Teaching
   - Interactive Corporate Training
   - Telemedicine

5. **Financial Services/Electronic Commerce**
   - Transaction Authorization and Processing
   - Fixed Location Online Financial Transactions / Home Banking
   - Business and Consumer Services from the home using "smart card" technology
   - Targeted Marketing / Interactive Marketing and Advertising

6. **Telecommuting Support Services**
   - Narrowband ISDN / Broadband ISDN
   - Remote Database Access
   - Client / Server Session Support

- Telecommuting / Work at Home / Home Business Center with Video Teleconferencing Capability
- Multipoint Videoteleconferencing

The cost-superior, wireless cellular broadband interactive LMDS system architecture is designed to support the full array of interoperability interfaces to the NII: appliance-to-network; appliance-to-application; application-to-application; and network-to-network at both physical and logical layers. The CVNY system in commercial operation today has established the operational support systems (OSS — order processing, customer service, billing, work order management and maintenance, and management reporting) to allow rapid deployment of these services as licensing and markets allow. The LMDS system, with its support of symmetric services and low per-subscriber cost is "dark fiber to everywhere" and is a critical component of the move toward parity among wireless and wireline networks.